

CLAIMS

1. A method of making a wear-resistant element, comprising:
shaping and sintering a material into a compact using iron-based alloy
5 powder containing Cr; and
conducting a nitriding treatment having no carburizing action to the
compact, thereby causing a surface of the compact to have a mixed structure of an
Fe-Cr-N compound layer, an Fe-Cr-N diffused layer, and a matrix.
2. A method of making a wear-resistant element, comprising:
10 shaping and sintering a material into a compact using alloy powder in
which at least one metallic element selected from Mn, Ti and V is contained in
iron-based alloy powder containing Cr; and
conducting a nitriding treatment having no carburizing action to the
compact, thereby causing a surface of the compact to have a mixed structure of an
15 Fe-Cr-N compound layer, an Fe-Cr-N diffused layer, and a matrix.
3. The method according to claim 1 or 2, wherein the compact has pores
formed in the surface thereof, the Fe-Cr-N compound layer being formed at
locations adjacent the pores, the mixed structure of the Fe-Cr-N diffused layer and
the matrix being formed at locations remote from the pores.
- 20 4. A method of making a wear-resistant element, comprising:
shaping and sintering a material into a compact using iron-based alloy
powder containing Cr; and
conducting a nitriding treatment having no carburizing action to the
compact, thereby causing a surface of the compact to have a mixed structure of an
25 Fe-Cr-N compound layer, an Fe-Cr-N diffused layer, and a matrix of a sorbite
structure.
5. The method according to claim 4, wherein the compact has pores
formed in the surface thereof, the Fe-Cr-N compound layer being formed at

locations adjacent the pores, the mixed structure of the Fe-Cr-N diffused layer and the matrix of the sorbite structure being formed at locations remote from the pores.

6. A method of making a wear-resistant element, comprising:

shaping and sintering a material into a compact using iron-based alloy

5 powder containing Cr;

quenching and tempering the compact;

conducting a nitriding treatment having no carburizing action to the compact; and

10 partially removing a surface of the compact, thereby causing the surface of the compact to have a mixed structure containing at least an Fe-Cr-N compound layer.

7. The method according to any one of claims 1 to 6, further comprising conducting an atmospheric treatment to the compact before the nitriding treatment.

8. The method according to claim 7, wherein the atmospheric treatment
15 is conducted at a temperature of 380°C or more.

9. A wear-resistant element comprising:

a sintered and nitrided material having a surface; and

a mixed structure of an Fe-Cr-N compound layer, an Fe-Cr-N diffused layer, and a matrix formed in the surface of the sintered and nitrided material,

20 wherein the surface of the sintered and nitrided material is entirely covered with grains or protrusions of $0.1 \sim 0.5 \mu\text{m}$.